

What is claimed is:

- 1 1. A method of providing hydraulic pressure for mechanical work from an engine
2 lubricating system in an internal combustion engine, the steps comprising:
 - 3 a) supplying oil from a variable displacement pump to an engine lubrication
4 gallery for lubricating the engine;
 - 5 b) supplying oil from the variable displacement pump to at least one engine
6 accessory having a variable oil demand, the accessories each having
7 individual pressure regulators;
 - 8 c) regulating the output of the variable displacement pump to a sum of fluid
9 flow required by the engine lubrication system and demand of fluid
10 generated by the individual pressure regulators of the engine
11 accessories regardless of engine output.
- 1 2. The method of claim 1, wherein at least one engine accessory is a hydraulic motor
2 driven cooling fan.
- 1 3. The method of claim 1, wherein at least one engine accessory is a power steering
2 system.
- 1 4. The method of claim 1, wherein at least one engine accessory is a hydraulic motor
2 driven air conditioning compressor.
- 1 5. The method of claim 1, wherein at least one engine accessory is a hydraulic motor
2 driven engine coolant pump.
- 1 6. The method of claim 1, wherein at least one engine accessory is a hydraulic motor
2 driven alternator.
- 1 7. The method of claim 1, wherein at least one engine accessory is a hydraulic motor
2 driven supercharger.
- 1 8. The method of claim 1, wherein at least one engine accessory is an electrohydraulic
2 valve actuation system.

9. The method of claim 1, wherein at least one engine accessory is a suspension actuator motor.

10. The method of claim 1, wherein the fluid flow for lubricating the engine is based on engine parameters.

11. A hydraulic on-demand engine accessory drive system for an internal combustion engine comprising:

a variable displacement pump mounted to a front cover of an engine block having a fluid communication input from a sump and an fluid communication output to a high pressure manifold;

a variable displacement pump controller mounted to the variable displacement pump and in communication with an ECU;

at least one engine accessory having variable oil demand and an individual pressure regulator, wherein the pressure regulator is in fluid communication with and has an input from the high pressure manifold and an output to the sump;

wherein the output of the variable displacement pump is regulated by the variable displacement pump controller to a sum of flow required by the individual pressure regulator of the at least one engine accessory and lubrication of the engine, regardless of engine output.

12. The system of claim 11, wherein the high pressure manifold powers the individual pressure regulator.

13. The system of claim 11, wherein the ECU monitors sensors on the engine.

14. The system of claim 13, wherein the sensors monitor temperature and speed of the engine.

15. The system of claim 11, wherein at least one engine accessory is a hydraulic motor driven cooling fan.

- 1 16. The system of claim 11, wherein at least one engine accessory is a power steering
2 system.
- 1 17. The system of claim 11, wherein at least one engine accessory is a hydraulic motor
2 driven air conditioning compressor.
- 1 18. The system of claim 11, wherein at least one engine accessory is a hydraulic motor
2 driven engine coolant pump.
- 1 19. The system of claim 11, wherein at least one engine accessory is a hydraulic motor
2 driven alternator.
- 1 20. The system of claim 11, wherein at least one engine accessory is a hydraulic motor
2 driven supercharger.
- 1 21. The system of claim 11, wherein at least one engine accessory is an electrohydraulic
2 valve actuation system.
- 1 22. The system of claim 11, wherein at least one engine accessory is a suspension actuator
2 motor.
- 1 23. The system of claim 11, further comprising an oil cooler in the output of the at least
2 one engine accessory to the sump.